Human resource management impact on knowledge management

Evidence from the Portuguese banking sector

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Abstract

Purpose – The purpose of this paper is to explain and empirically test the dependence of organizational processes related to knowledge on the nature of assumptions operating in processes of human resource management (HRM) in organizations. It concentrates on practices related to training, career development and retention.

Design/methodology/approach – This empirical study as a quantitative nature and the sample is made up of 5,306 collaborators in 634 organizations belonging to an economic group in the banking sub-sector. Data were collected through two questionnaires: human resource management practices questionnaire and knowledge management questionnaire – short form. The model was tested by applying univariate and multivariate multiple regression analyses.

Findings – Findings provide support for the proposed model and show the predictive capacity of the HRM practices regarding knowledge management (KM) processes, revealing a strong direct relationship between the two constructs. It stands out that the people management practices adopted from an organic and valued perspective possess a particular and distinctive capacity to predict and impact positively on KM processes.

Practical implications – The findings may be used by human resources and KM practitioners interested in the development of organizational knowledge through human resource practices.

Originality/value – The main contribution of this study is to confirm the close relationship of dependency between organizational management processes regarding people and knowledge, showing the positive effect of best practices of HRM on KM processes, as opposed to traditional or transactional practices.

Keywords Service sector, Knowledge management, Training, Human resource management, Career development, Retention

Paper type Research paper

1. Introduction

This paper focuses on questions of organizational knowledge, human resources and the dynamics of relations developed between them, within the dominant perspectives and assumptions in people management. The literature suggests that knowledge management

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(KM) is not alien to the orientations adopted in the management and application of processes related to people.

A strong body of literature and various scientific studies give a foundation to the subject analysed here, suggesting an analysis and comprehension based on a viewpoint of complementarity and interdependence of the two constructs (human resource management (HRM) and KM), considering the contribution they should make in terms of innovation, competitive advantage and organizational performance (Gloet and Berrell, 2003; Mansour and Gaha, 2004; Majeed, 2009; Minbaeva *et al.*, 2009, López-Cabrales *et al.*, 2009; Simonin and Özsomer, 2009; Chen and Huang, 2009; Brewer and Brewer, 2010). Specifically, concerning HRM processes, training, career development and retention are analysed here, seeking to understand the relational dynamics developed between these three people-management processes and four knowledge-management processes: knowledge-centred culture; competitive orientation; formal KM practices; and informal KM practices, in organizations in the banking sub-sector of the service sector.

Similarly to what happens in other sectors of the economy, and due to an environment characterized by turbulence and continuous change, the service sector, and particularly the financial sector, has been subject to major changes of a structural, legal and technological order. As a consequence of these changes, in recent decades the financial sector has recorded unprecedented growth rates, to become the principal body in charge of international commerce. It is estimated that in 2020 the weight of this sector in global exchanges rose to 50 per cent (Tomé, 2011). Even so, despite being the economic sector with highest growth rates in developed countries, it is the one researchers have paid least attention to (Legge, 2005; Tomé, 2011). Nevertheless, some studies emerged (e.g. Ali and Ahmad, 2006; Bontis and Serenko, 2007, 2009; Cabrita and Bontis, 2008; Theriou and Chatzoglou, 2009) aiming to explore and understand questions of intellectual capital, organizational learning, human resource management (HRM) and KM in the banking sub-sector. Common to all these studies is the supposition that these intangible assets and their management, also for firms in this sector, are determinants of the level of competitiveness. Our study arises in this context, aiming to contribute to understanding the subjects of HRM and KM in the financial sector.

In operationalizing the nuclear objective of this paper, four sections follow this introduction. Therefore, Section 2 presents the literature review, with Section 3 describing the empirical study. Sections 4 and 5, respectively, discuss the results and present the conclusions, limitations and main contributions.

2. Theoretical background

In the current context, where change is the main factor affecting evolution at the most varied levels, the greatest challenge organizations face is in their capacity to create, improve and manage new knowledge as a valuable asset (Pinho *et al.*, 2012). As stated by Akhavan *et al.* (2013), successful organizations will be the ones that are able to improve and develop their knowledge. This implies thinking of people as creators and holders of knowledge, with potential and competences that should be directed and collectively organized, besides reorienting management practices according to the demands of the emerging knowledge society. Therefore, people take on increasing importance (Ubeda-Garcia *et al.*, 2013).

Concerning people or HRM, the above-mentioned knowledge era presents new and complex challenges, potentiating and promoting the change from traditional and eminently bureaucratic, mechanistic staff management to another based on distinct

functions. HRM should function as a support for the organization's competitive advantage, contributing to better organizational performance (Dominguez, 2011; Lerín *et al.*, 2001; Othman, 2009; Short and Harris, 2010).

HRM is understood here as a set of policies, practices and systems that influence the behaviour, attitudes and performance of members of the organization, in order to increase their competitiveness and learning capacity, to the extent of creating a culture of learning (Gomes *et al.*, 2008; Razouk *et al.*, 2009; Edvardsson, 2008; Rebelo, 2006). So set in contemporary academic positioning, HRM should perform a set of roles that allows it to contribute to greater flexibility and a greater capacity for adaptation and organizational adjustment. It is therefore given the primary responsibility of facilitating processes of knowledge and organizational learning with a view to fulfilling strategic objectives (Lengnick-Hall and Lengnick-Hall, 2003).

As for KM, it is conceptualized here as the set of efforts to optimize and develop internal organizational conditions that catalyze all processes and practices related to knowledge, in order to fulfil organizational objectives (Cardoso, 2007; Civi, 2000). These practices concern activities integrated in strategy and organizational behaviours, able to develop and operationalize KM processes (Cardoso *et al.*, 2012), which has become in itself a competitive advantage for organizations (Tessier and Bourdon, 2009).

In this setting, HRM acquires a key role in potentiating and facilitating both KM and learning processes (Intan-Soraya and Chew, 2010; Lengnick-Hall and Lengnick-Hall, 2003; Magalhães, 2005; Pablos, 2004; Svetlik and Stavrou-Costea, 2007), with the need to reposition its functions, orienting them towards strategic capacities of knowledge, i.e., managing knowledge workers, constructing value from knowledge and assessing the risk of knowledge loss (Whiker and Andrews, 2004). Through its practices, it should therefore contribute to increasing the volume of knowledge, motivating collaborators to transfer their knowledge to the organization and strengthening the links between human capital management and KM in organizations (Gloet, 2006; López *et al.*, 2006; Pastor *et al.*, 2010).

KM is sometimes regarded as if it was technically and politically neutral with regard to pre-existing management processes and their underlying assumptions. Strategy alignment between organizational, human resources and knowledge seems a key element for organizational management in the knowledge era. Shih and Chiang (2005) presented a study of integration and alignment between organizational business strategies' dualities (cost leadership/differentiation), management strategies of human resources (buy-bureaucratic/make-organic) and KM strategies (codification/personalization). This study was instrumental for a relativistic value of different orientations of management strategies and, above all, to understand the value of their potential integration and the indispensability of their strategic alignment.

The study of the association between these variables is a clear indicator of the present tendency of not thinking of KM and carrying it out independently from a set of strategic organizational policies, with clear efforts to create systems and processes that support activities for potentiating knowledge, anchored in strategy and integrated in the organization's core operations. HRM must be analysed as a factor potentially influencing KM implementation. KM's effectiveness will often depend on HR organizational management processes and on the quality of (organization, people and knowledge) management's strategic alignment (Shih and Chiang, 2005).

Despite giving prominence to a strategic and integrated understanding of HRM, the literature often highlights in the relationship with KM the contributions coming from specific processes

Monteiro and Pais (2014) give theoretical and empirical evidence for scientific analysis of HRM as a conditioning factor of KM. For Minbaeva *et al.* (2009) mechanisms for recruitment, selection, placement and retention are fundamental aspects of the construction and maintenance of organizational knowledge stock. In the same way, human resource practices such as training, work design, feedback on performance, career development and others contribute instrumentally to improving the knowledge flow, i.e., acquisition, transfer and its integration in the organization.

According to Santana *et al.* (2009), it is possible to consider that some processes will have a special role in capacities, others will be more relevant in the field of motivations and a third group will be relevant in terms of opportunities.

HRM processes associated with human resource training and development have occupied historically a particularly relevant place in this relationship (Valle *et al.*, 2000). However, this type of intervention, while necessary, is not seen as sufficient, as it seems fundamental to create a cultural climate that stimulates collaborators' active participation in processes, in using and developing the knowledge acquired with a view to the future. HRM presents the potential to influence how employees cope with the dilemma of participating, or not participating, and in affirmative cases, how to participate.

Thite (2004, p. 40) considers that "through the right philosophy and systems, HR can play a leading role in KM". From previous research (e.g. Escuder *et al.*, 2010; López *et al.*, 2006; Harman and Brelade, 2007; Minbaeva, 2005; Ooi *et al.*, 2009; Pablos, 2004; Pastor *et al.*, 2010; Theriou and Chatzoglou, 2008; Trabelsi and Berre, 2009; Valle *et al.*, 2000), the principal focus of this work will concern a model articulating specific HRM processes (training, career management and retention) as potential determinants of KM processes, according to the predominance of contemporary-organic assumptions seen as potential facilitators or traditional-mechanic ones seen as potential inhibitors (see Figure 1).

In this theoretical framework of strategic analysis of HRM's impact on KM, the concept of best practices emerges, based on the supposition that the influence of HRM organizational processes, with organic configuration, may be positive/facilitating of KM application, and there could be "best ways" to manage human resources, and that service firms adopting them will be more successful, here in terms of KM application, than those who do not.

Best practices, in a broad sense, appear in the literature as high-performance work systems (HPWS), and although open to criticism for neglecting to some extent the effects of context (Brewster, 2007; Martin-Alcazar *et al.*, 2005, 2012; Wright and Brewster, 2003), they have gained relevance in contemporary positioning with regard to HRM. Authors such as Theriou and Chatzoglou (2008) define best practices as a set of all HRM practices and policies that lead to effective improvement of organizational performance. In their opinion, the best and most referred to practices are: high levels of group work; remuneration associated with performance; de-centralized decision-making process; intelligent recruitment and selection processes; limited differences in status; extensive training; procedures/agreements for internal communication and collaborator involvement; internal career opportunities; and generic description of functions in no great detail. These have to do with: valuing collaborators' competences, skills and knowledge through effective recruitment and training; motivation setting out from a strong incentive system; and promoting opportunities for the most highly qualified and motivated collaborators, contributing to increasing their levels of knowledge and competence through (re)designing work and indirect forms of participation.

With a growing body of literature linking HR systems and systems of high-performance work practices to organizational performance outcomes (e.g. Liu *et al.*, 2006),

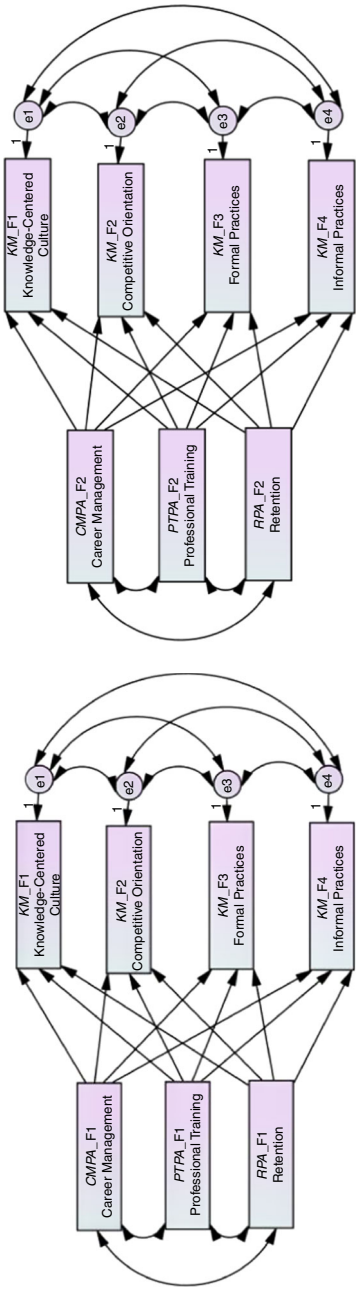

Figure 1.
Proposed
theoretical model

recent research has pushed for examination of the underlying mechanisms that enable this connection (e.g. Messersmith *et al.*, 2011). Although the results of studies on HPWS yield promising results as to their effectiveness, many questions remain unanswered, particularly, what their impact is on other processes in the organization. So this paper does not intend to explore the relation between organizational processes and results, but instead, explore the relation between two organizational management processes (HR and knowledge).

Nevertheless, various studies show the major contribution of resource management and KM to organizational performance and the quality of services provided (Apospori *et al.*, 2008; Bae and Lawler, 2000; Becker and Huselid, 1998; Bontis and Serenko, 2009; Cabrita and Bontis, 2008; Chen and Huang, 2009; Civi, 2000; Gerhart, 2005; Delaney and Huselid, 1996; Gloet, 2006).

Organizations with HPWS utilize a fundamentally different approach to management from the traditional hierarchical approach associated with mass production/scientific management.

According to the work by Sparrow and Hiltrop (1994), up to 1970, the literature on HRM reflected a vision of human resources as a "cost". During the 1970s, a new vision appears, now seeing this as an "investment". The theoretical perspectives guiding this investigation allowed us therefore to assume an analytical reference constructed from assumptions and ideological frameworks arising from two paradigms in HRM's evolution. The first, traditional, related to character-types of human resource administration in a classic industrial period at the beginning of the twentieth century, and the other, organic, related to the characteristics of management of and with people in the present information and knowledge era at the end of the twentieth century and beginning of the twenty-first, confronting them in terms of ideology and practice, operational strategies and conceptions.

Camelo-Ordaz *et al.* (2011) agree with this position when they state that the literature identifies two basic perspectives which organizations can choose concerning the management of relationships with their employees. They distinguish between a transactional or traditional perspective, that determines the application of HRM practices promoting short-term exchange relationships between the organization and its employees, and another based on HRM practices of high involvement, emphasizing long-term relationships of mutual exchange.

While admitting these practices of major involvement can vary from one study to another, they nevertheless say they include generically: the creation of opportunities for development and promotion in the internal market; recruitment and selection based more on adjustment between external applicants and the organization than on the specific requirements of the function; assessment and reward systems based on the performance of the organization or the team; training and development practices that promote long-term collaborator development and teambuilding. They confirm in their study that these practices of high involvement, and organic HR, coinciding with those previously referred to here as best practices, are more positively related to organizational performance and KM practices than is the case with traditional or transactional practices. The idea of best practices in this paper refers to HRM practices that are, in specific organizational environments and time, best in KM processes' facilitation and application.

Added to these practices is retention, on the assumption that the risk of collaborators leaving the firm and consequent loss of knowledge should be minimized. Organizations should therefore find the best way to hold on to employees (Riveros and Tsai, 2011) whose talent and expertise are determinants of high performance

(Felin *et al.*, 2009; Minbaeva *et al.*, 2009), through human resource practices designed to motivate collaborators (Yamao *et al.*, 2009), highlighting appropriate policies on career development (e.g. promotion criteria of a qualitative nature) (Escuder *et al.*, 2010).

Indeed, for a long time human and social factors have been pointed out as key factors in developing processes of organizational management, and particularly that of knowledge-sharing (Nonaka and Takeuchi, 1995). More recent studies strongly emphasize the need to analyse the two subjects together, with a view to understanding and assessing the impact of HRM practices on KM processes (Al-bahussin and El-garaihy, 2013; Camelo-Ordaz *et al.*, 2011; Chiang *et al.*, 2011; Fong *et al.*, 2011; Hislop, 2003; Jimenez-Jimenez and Sanz-Valle, 2013; Oltra, 2005; Scholl *et al.*, 2004; Svetlik and Stavrou-Costea, 2007; Yahya and Goh, 2002).

Yahya and Goh (2002) say that the connection between HRM and KM is so deep that we can consider KM as an evolved form of HRM, as through the use of information technology it supports human interactions and collaborative processes. According to the authors, in this relationship, HRM is responsible for monitoring tasks, measuring and intervening in the construction, incorporation, spread and use of knowledge by collaborators. Svetlik and Stavrou-Costea (2007) also justify this relationship, defending the idea that HRM concerns effective people management and if people are the most valuable resource in knowledge, then HRM and KM are intimately inter related.

Other authors such as Kase and Zupan (2007), Minbaeva *et al.* (2009), Razouk *et al.* (2009), Tessier and Bourdon (2009), López-Cabrales *et al.* (2009) and Brewer and Brewer (2010) underline and demonstrate this strategic relationship, stressing the benefits of an integrated approach. The literature review carried out points to understanding of HRM from a dual perspective (traditional-mechanic/contemporary-organic), with the perspective having the most positive effect on both KM processes and organizational performance being the one which promotes so-called best practices or practices of high involvement, i.e., a contemporary-organic perspective.

3. Empirical study

3.1 Implementation

This study was made in a public organization with national coverage in the banking sub-sector of the service sector. This organization is divided into four large geographical areas. The study focused on three of those regions, covering 634 bank branches with a total of 5,306 permanent collaborators in Portugal. A previous version of the questionnaire was administered to a convenience sample made up of collaborators in two bank branches in the central region ($n = 53$; 54.7 per cent females, 69.8 per cent graduates, $M_{age} = 36.2$ years). From these respondents, we obtained information about the clarity of the items, made the necessary adjustments and finally submitted this version to exploratory factor analysis (Figueiredo, 2013). This analysis validated the set of items that came to form the final version of the questionnaire. This version was made available online to 5,306 collaborators. We used the random probabilistic sampling by clusters method, the universe of subjects being divided in groups based on the organization's formal structuring. Agencies in the North, Central and Lisbon regions were selected. Meetings were held with those in charge of the bank branches with a view to: clarifying the nature, type and objectives of the study; discussing the instruments to apply; defining the necessary sample, both for the previous version of the questionnaire and the final one; and defining the time the instruments would be made available electronically. The introduction and availability of the instruments on the electronic platform was the exclusive responsibility of the

branches, since according to internal security norms, access to this is barred to external entities. The estimated time to respond was approximately ten minutes.

We obtained a total of 850 completed questionnaires. The overall average percentage of responses was 16 per cent. The response rate was found to be robust and sufficiently large to produce statistically significant results (Takeuchi *et al.*, 2003). Isobe *et al.* (2000) indicate approximately 14.5 per cent as the minimum response rate for studies resorting, as here, to the survey research method. Participants carried out leader (1.4 per cent), management (52.1 per cent), technical (2.1 per cent) and clerical (44.3 per cent) duties. The greatest number ($n = 288$; 33.9 per cent) have been performing the same function for more than ten years, followed by one to three years ($n = 212$; 24.9 per cent) and five to ten years ($n = 120$; 14.1 per cent). The sample is made up of 428 males (50.4 per cent) and 422 females (49.6 per cent). Ages vary between 20 and 50 years and over, with the most frequent age-group being between 41 and 50 years ($n = 232$; 27.3 per cent), followed by those aged between 20 and 29 years ($n = 168$; 19.8 per cent) and 36 to 40 years ($n = 159$; 18.7 per cent).The majority of participants have higher education ($n = 463$; 54.5 per cent) followed by secondary education ($n = 250$; 29.4 per cent).

Non-experimental cross-sectional research design was implemented, based on data of a quantitative nature (Anastas and MacDonald, 1994; Robson, 2002). Data were therefore collected through the survey method, resorting to the technique of the self-administered questionnaire. All the procedures adopted in this empirical study aimed to respect all the ethical assumptions of an empirical study, ensuring maximum confidentiality. The data were analysed using version 22.0 of the SPSS and AMOS programmes.

3.2 Methodology

3.2.1 Research design and hypothesis. Based on the literature review, we assume that HRM practices can form a determinant of organizational processes related to knowledge. In this context, we define as the central research question empirical support for the (conceptually defined) relationship according to which the perspective configuring the HRM practices implemented in an organization has an impact on how KM processes operate therein.

To achieve the goals of this study, we formulate the following hypotheses:

H1. Collaborator perception corresponding to the development of HRM from a more organic perspective will correspond to a positive impact on how knowledge management processes operate.

H2. Collaborator perception corresponding to the development of HRM from a more traditional/mechanistic perspective will correspond to the lack of impact or negative impact on how knowledge management processes operate.

This paper arises from a more wide-ranging study (Figueiredo, 2013) where six HRM practices were studied: training, career development, retention, RandS, ADF and welcome. Assessment instruments were constructed and adopted for each of these practices (Figueiredo, 2013; Monteiro, 2010) based on the theoretical model we set out from. This model considers that HRM can be understood from a dual logic, setting an organic perspective (based on assumptions of value and development), against another mechanical one (based on assumptions of a restrictive and non-value orientation). This double perspective inspired the conception and development of each of the sub-scales referred to above. From that set of six sub-scales, those assessing practices related

to training, career development and retention were seen to be the most important in explaining the organic/traditional perspectives of HRM. This is because they present a factorial structure that is better adjusted to the theoretical model we set out from. Each of them (training, career development and retention) has a bi-factorial structure where Factor 1 (F1) is composed of items of a more organic nature, as opposed to Factor 2 (F2) which tends to be more mechanic/traditional. For this reason, these three practices were adopted in this paper to explain the organic/traditional perspectives of HRM.

3.2.2 Measures. We used the following scales (see Appendix 1) for data collection: human resource management practices (HRMP), specifically the sub-scales career management perspectives and assumptions (CMPA) (Figueiredo, 2013), professional training perspectives and assumptions (PTPA) (Monteiro, 2010) and retention perspectives and assumptions (RPA) (Figueiredo, 2013); and KM: KM (Pais, 2014).

CMPA and RPA are sub-scales of the HRMP scale, developed by Figueiredo (2013), and used for the first time with our sample, justifying the need to explore their constituent dimensions through exploratory factor analysis (EFA). PTPA was created by Monteiro (2010) and used for the first time in a sample of employees in the ceramics industry and for the second time with our sample (though EFA we found reproduction of the factorial structure analysed by Monteiro, 2010). All these subscales present a two-factor structure, resulting from principal component analysis (PCA with varimax rotation) with CMPA being made up of a total of 15 items ($\alpha_{global} = 0.869$), PTPA from a total of 23 items ($\alpha_{global} = 0.912$) and RPA with a set of 12 items ($\alpha_{global} = 0.920$). It is important to point out that the two factors integrating the sub-scales analysed here are, from the content of their constituent items, conceptually distinct. Specifically, F1 of both sub-scales is composed of items of a more organic nature, as opposed to F2 which tends to be more mechanic.

As for the CMPA sub-scale, the first factor, called F1: career management based on merit and development, groups a set of items that value personal merit and development of aptitudes and competences, from a perspective of less programmed careers, linked to higher levels of initiative and autonomy (eigenvalue = 5.95; 39.64 per cent of explained variance; ten items; factorial loadings $\geqslant 0.528$; $\alpha = 0.901$). Here, career management is perceived as a responsibility shared between the employee and the organization, the former expecting development opportunities with a view to maintaining his employability, more than job security. In this setting, career management implies multiple routes to acquire competences, not being restricted to a rising set of hierarchical movements (Gomes *et al.*, 2008; Lerín *et al.*, 2001). The second refers to items that highlight length of service and job security, representing traditional career management following the principle of hierarchical progression based on length of service (eigenvalue = 12.43; 12.44 per cent of explained variance of; five items; factorial loadings > 0.456; $\alpha = 0.654$). Here, responsibility for career management is a unilateral process, depending only on the organization, and is associated with stable job relations, in general, in exchange for more modest remuneration (Gomes *et al.*, 2008). It contains the principle of a job for life. This was called F2: career management based on length of service and tenure (Figueiredo, 2013).

Regarding the PTPA sub-scale, the two factors are designated by Monteiro (2010): F1: training as investment and F2: training as restriction. We decided to carry out a PCA (varimax rotation) in order to find out if the two-factorial structure obtained by Monteiro (2010) was reproduced. We obtained the same factorial structure. The first factor refers to a perspective of valuing training as strategic investment, with the emphasis on pro-active collaborator development (eigenvalue = 7.32; 36.58 per cent of

explained variance of; 14 items; factorial loadings > 0.541; $\alpha = 0.919$). "[…] Training is seen as a form of organizational individual development. The second factor represents an understanding of 'training as a restriction for organizations' (eigenvalue = 3.38; 16.92 per cent of explained variance of; 6 items; factorial loadings > 0.444; $\alpha = 0.835$). In this context, training activities are perceived as irrelevant, useless or even harmful and burdensome both in terms of the time spent on them and the cost involved. Training is an end in itself, and seen in the strict sense of meeting administrative-legal requirements, as an obligation to be met and not as a form of individual and/or organizational development" (Monteiro, 2010, p. 249).

Considering the sub-scale of RPA, the first factor called F1 – retention oriented to factors intrinsic to work groups items referring to promoting and valuing fulfilment of the individual's potential, through freedom, autonomy and performing tasks perceived as interesting, participation, prestige and reputation (eigenvalue = 6.64; 55.36 per cent of explained variance nine items; factorial loadings > 0.572; $\alpha = 0.931$). F2 joins items regarding aspects extrinsic to the work, namely, salary, bonuses and other benefits of a financial or other nature, which can be considered as secondary gains; and activities of a sporting and/or cultural character, adopting the designation of F2 – retention oriented to factors extrinsic to the work relationship (eigenvalue = 10.95; 10.95 per cent of explained variance; three items; factorial loadings > 0.695; $\alpha = 0.756$).

Finally, we performed confirmatory factor analysis on the short form of the KM questionnaire (KMQ-SF), formed by 22 items, widely used in several samples since 2003 and pointing to an invariant tetra-factorial model (e.g. Brito and Cardoso, 2012; Pais, 2014), which was confirmed using the sample of our study, obtaining an acceptable adjustment to the four-factor structure presented by the author, CMIN/df = 7.36, NFI = 0.845, CFI = 0.863, RMSEA = 0.087: F1: knowledge-centred culture ($\alpha = 0.877$; seven items), F2: competitive orientation ($\alpha = 0.750$; four items), Factor 3 (F3): formal KM practices ($\alpha = 0.827$; six items) and Factor 4 (F4): informal KM practices ($\alpha = 0.790$; five items).

We adopt and use the Cardoso (2003), Cardoso and Gomes (2011) and Pais (2014) conceptualization and operationalization. This is a personification and people-oriented perspective of KM, according to which knowledge is closely associated with the person who developed it, who holds it and who uses it. Social interactions (above all face-to-face ones) are the best means for its acquisition, share and use to occur effectively (especially if the knowledge shared is mostly tacit) (Pais and dos Santos, 2015; Snowden, 2000). Technology is considered to be essentially a catalyst of some KM processes in circumstances where knowledge is of a mostly explicit nature. Following a personification perspective of KM involves constant investment in human resources, in people, aiming to prepare and support them so that they can participate more actively in a KM strategy, understand, be committed to, and accomplish its goals. In this sense, social, human and cultural factors are anchors of potentially successful KM processes and consequently of KM practices. Pais (2014) proposes four dimensions of KM: knowledge-centred culture, competitive orientation, formal KM practices, and informal KM practices.

According to the designation attributed, the first reflects a shared set of values, a framework that guides practices, rules, norms and procedures established in the organization. This factor relates to a cultural orientation, where the value of knowledge is central in promoting organizational performance. The second factor mirrors the organization's orientation to its external environment, from a perspective of comparative assessment, constant adaptation and looking for a sustained position in the market. The third factor joins organizational actions developed and formally established, centred on

knowledge of a mainly explicit nature (its creation/acquisition, preservation, share and use). Finally, the fourth factor includes informal interactions occurring in the organization, which facilitate the social construction of knowledge, emerging from the use of a common and collective language. This is mainly tacit knowledge, which is difficult to create and put into practice in the absence of (face-to-face) contact between the different organizational actors.

3.3 Results

Table I presents mean scores, standard deviations and correlations (r; R^2 into brackets) between KM (KM) and career management (CMPA), professional training (PTPA), and retention (RPA). We found a significant superiority of career management based on merit and development (*CMPA*_F1) over career management based on length of service and tenure (*CMPA*_F2), $t(849) = 17.56$, $p < 0.001$. Professional training as investment (*PTPA*_F1) was higher than professional training as restriction (*PTPA*_F2), $t(849) = 37.36$, $p < 0.001$. Retention oriented to factors intrinsic to the work relationship (PPR_F1) was slightly higher than retention oriented to factors extrinsic to the work relationship (PPR_F2), $t(849) = 2.09$, $p = 0.037$. Factors of knowledge-centred culture (*KM*_F1) and competitive orientation to knowledge (*KM*_F2) presented the most positive results, being higher than formal KM practices (*KM*_F3), $t(849) = 20.60$ and $= 16.33$ ($p < 0.001$), and higher than informal KM practices

			r (R^2)			
	M	SD	*KM*_F1	*KM*_F2	*KM*_F3	*KM*_F4
CMPA	3.32	0.53	0.486 (0.24)***	0.384 (0.15)***	0.646 (0.42)***	0.398 (0.16)***
CMPA _F1: career management based on merit and development	3.46	0.63	0.550 (0.30)***	0.428 (0.18)***	0.706 (0.50)***	0.423 (0.18)***
CMPA _F2: career management based on length of service and tenure	3.05	0.61	0.127 (0.02)***	0.113 (0.01)**	0.222 (0.05)***	0.162 (0.03)***
PTPA	3.37	0.41	0.609 (0.37)***	0.536 (0.29)***	0.690 (0.48)***	0.459 (0.21)***
PTPA _F1: professional training as investment	3.77	0.55	0.784 (0.61)***	0.683 (0.47)***	0.795 (0.63)***	0.586 (0.34)***
PTPA _F2: professional training as restriction	2.44	0.79	−0.197 (0.04)***	−0.163 (0.03)***	−0.073 (0.01)*	−0.141 (0.02)***
RPA	3.30	0.65	0.520 (0.27)***	0.438 (0.19)***	0.685 (0.47)***	0.414 (0.17)***
*RPA*_F1: retention oriented to factors intrinsic to the work relationship	3.31	0.68	0.530 (0.28)***	0.435 (0.19)***	0.701 (0.49)***	0.405 (0.16)***
*RPA*_F2: retention oriented to factors extrinsic to the work relationship	3.26	0.82	0.327 (0.11)***	0.302 (0.09)***	0.421 (0.18)***	0.302 (0.09)***
KM	3.82	0.50				
*KM*_F1: knowledge-centred culture	3.93	0.53	1			
*KM*_F2: competitive orientation to knowledge	3.90	0.56	0.768 (0.59)***	1		
*KM*_F3: formal KM practices	3.62	0.63	0.742 (0.55)***	0.658 (0.43)***	1	
*KM*_F4: informal KM practices	3.85	0.58	0.694 (0.48)***	0.590 (0.35)***	0.591 (0.35)***	1

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table I.
Mean scores, standard deviations and correlations (r; R^2 into brackets) between KM (KM) and career management (CMPA), professional training (PTPA), and retention (RPA)

(*KM*_F4), $t(849) = 5.25$ and $= 3.06$ ($p < 0.01$). Informal practices (*KM*_F4) were significantly above formal practices (*KM*_F3), $t(849) = 11.83$, $p < 0.001$.

The intercorrelations between KM dimensions and career management showed higher associations with career management based on merit and development (shared variance between 18 and 50 per cent) compared to career management based on length of service and tenure (shared variance between 1 and 5 per cent). The associations between KM dimensions and professional training were revealed to be positive and strong with professional training as Investment (shared variance between 34 and 63 per cent) and negative and weak with professional training as restriction (shared variance between 1 and 4 per cent). The associations between KM dimensions and retention were higher with retention oriented to factors intrinsic to the work relationship (shared variance between 16 and 49 per cent) compared to with retention oriented to factors extrinsic to the work relationship (shared variance between 9 and 18 per cent). The VIFs did not indicate problems of multicollinearity.

3.3.1 KM forecast from career management. Aiming to assess to what extent the factors of career management are good predictors of KM and test the hypotheses formulated, we performed a set of multiple regression analyses, considering the global measure of KM and each of its constituent factors. In all the regression analyses the model's assumptions were tested, namely, that of normal distribution and homogeneity (validated graphically) and independence of errors (validated with the Durbin and Watson's, 1971 statistic).

For the two factors, career management based on merit and development (*CMPA*_F1) and based on length of service and tenure (*CMPA*_F2), the multiple regression carried out with the global scale of the KM questionnaire showed that, overall, the two career management factors are responsible for 39.3 per cent of the variability of global KM, although only *CMPA*_F1 is seen to be a significant predictor (see Table II). Observation of Table II of the standardized regression coefficients β and the respective statistical significance shows that both factors of career management predict knowledge-centred culture (*KM*_F1), albeit in opposing directions: whereas career management based on merit and development is seen to promote *KM*_F1, career management based on length of service and tenure is seen to inhibit that factor. As for factor *KM*_F2 (competitive orientation), and similarly to the global KM scale, only the first factor of the career management sub-scale (*CMPA*_F1) is seen to predict *KM*_F2. Therefore, the more career management is based on merit and development, the greater the competitive orientation to knowledge. Concerning *KM*_F3 (formal KM practices), the prediction obtained was considerably higher, despite only career management based on merit and development showing itself to be a (positive) significant predictor of formal KM practices, with career management based on length of service and tenure showing no predictive effect. The result obtained for *KM*_F2 and *KM*_F3 was shown to be extendable to factor *KM*_F4 (informal KM practices), in which only career management based on merit and development is shown to be significant in forecasting informal KM practices.

3.3.2 KM forecast from professional training. As for the factors of professional training (*PTPA*_F1: training as investment and *PTPA*_F2: training as restriction), the multiple regression performed with the global scale of the KM questionnaire presented a high $r_{multiple}$, despite only *PTPA*_F1 showing itself to be a predictor of the global KM scale (see Table III). Analysing the contribution of professional training to each factor of KM, in forecasting *KM*_F1 and *KM*_F3, both factors of professional training are

Career management – predictors	KM global scale				KM – criterions *KM*_F1: knowledge-centred culture				*KM*_F2: competitive orientation				*KM*_F3: formal KM practices				*KM*_F4: informal KM practices			
	b	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	***B***	*t*	*b*	SE	*β*	*t*
*CMPA*_F1	0.51	0.02	0.64	22.38***	0.49	0.03	0.58	18.96***	0.40	0.03	0.45	13.40***	0.72	0.03	0.72	27.66***	0.39	0.03	0.42	12.55***
*CMPA*_F2	−0.04	0.02	−0.05	−1.78	−0.08	0.03	−0.09	−2.80**	−0.05	0.03	−0.05	−1.50	−0.04	0.03	−0.04	−1.60	0.01	0.03	0.01	0.24
	$r_{multiple} = 0.627$, $R^2 = 0.393$				$r_{multiple} = 0.556$, $R^2 = 0.309$				$r_{multiple} = 0.431$, $R^2 = 0.186$				$r_{multiple} = 0.707$, $R^2 = 0.501$				$r_{multiple} = 0.423$, $R^2 = 0.179$			
	$R^2_{aj} = 0.392$, SE = 0.391				$R^2_{aj} = 0.308$, SE = 0.443				$R^2_{aj} = 0.184$, SE = 0.503				$R^2_{aj} = 0.499$, SE = 0.445				$R^2_{aj} = 0.177$, SE = 0.529			
	$F(2, 847) = 274.1$, $p < 0.001$				$F(2, 847) = 189.5$, $p < 0.001$				$F(2, 847) = 96.5$, $p < 0.001$				$F(2, 847) = 424.4$, $p < 0.001$				$F(2, 847) = 92.3$, $p < 0.001$			

Notes: *CMPA*_F1, career management based on merit and development; *CMPA*_F2, career management based on length of service and tenure; **$p < 0.01$; ***$p < 0.001$

Table II.
Multiple regression analysis of KM forecast from the two factors of the career management

Table III.
Multiple regression analysis (enter method) of KM forecast from the two factors of the professional training

Professional training – predictors	KM global scale				KM – criterions *KM*_F1: knowledge-centred culture				*KM*_F2: competitive orientation				*KM*_F3: formal KM practices				*KM*_F4: informal KM practices			
	b	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	*β*	*t*
*PTPA*_F1	0.76	0.02	0.82	42.3***	0.75	0.02	0.77	36.0***	0.688	0.026	0.675	26.6***	0.93	0.02	0.81	38.3***	0.62	0.03	0.58	20.5***
*PTPA*_F2	−0.01	0.01	−0.02	−1.1	−0.04	0.01	−0.07	−3.1**	−0.034	0.018	−0.049	−1.9	0.05	0.02	0.06	3.0**	−0.03	0.02	−0.04	−1.5
	$r_{multiple} = 0.829$, $R^2 = 0.687$				$r_{multiple} = 0.787$, $R^2 = 0.619$				$r_{multiple} = 0.685$, $R^2 = 0.469$				$r_{multiple} = 0.797$, $R^2 = 0.636$				$r_{multiple} = 0.587$, $R^2 = 0.472$			
	$R^2_{aj} = 0.686$, SE = 0.281				$R^2_{aj} = 0.619$, SE = 0.329				$R^2_{aj} = 0.468$, SE = 0.406				$R^2_{aj} = 0.635$, SE = 0.380				$R^2_{aj} = 0.343$, SE = 0.380			
	$F(2, 847) = 930.1$, $p < 0.001$				$F(2, 847) = 689.4$, $p < 0.001$				$F(2, 847) = 374.6$, $p < 0.001$				$F(2, 847) = 738.5$, $p < 0.001$				$F(2, 847) = 223.1$, $p < 0.001$			

Notes: *PTPA*_F1, professional training as investment; *PTPA*_F2, professional training as restriction. **$p < 0.01$; *** $p < 0.001$

contributors, albeit in opposing directions: if professional training as investment increases culture and formal practices of KM, professional training as restriction inhibits culture and promotes formal KM practices, although with a lower magnitude. Only professional training as investment (*PTPA*_F1) was shown to be significant in predicting competitive orientation (*KM*_F2) and informal practices (*KM*_F4).

3.3.3 KM forecast from retention. We now performed a multiple regression analysis considering the effects of the two factors of Retention (*RPA*_F1: retention oriented to factors intrinsic to the work relationship and *RPA*_F2: retention oriented to factors extrinsic to the work relationship) on KM (see Table IV). The two factors of retention explained 37.9 per cent of the variance of global KM, although *RPA*_F1 was more significant than *RPA*_F2. Only *RPA*_F1 was a significant and positive predictor of knowledge-centred culture (*KM*_F1). For *KM*_F2 both factors of the career management were shown to be significant predictors. Therefore, both retention oriented to factors intrinsic to the work relationship and retention oriented to factors extrinsic to the work relationship contribute to greater competitive orientation to knowledge, although the first factor of RPA significantly more so than the second. Focusing on *KM*_F3, and similarly to *KM*_F1, only retention oriented to factors intrinsic to the work relationship was seen to predict formal KM practices. Finally, for *KM*_F4, both retention oriented to factors intrinsic to the work relationship and retention oriented to factors extrinsic to the work relationship indicate a positive prediction of informal KM practices, although the first factor more significantly.

3.3.4 Exclusively organic and mechanical HRM practices in KM processes. Aiming to assess the trajectories of the organic and mechanical dimensions of HRM practices in KM processes, we performed multivariate multiple linear regression analysis. The significance of the regression coefficients was assessed after parameter estimation through the maximum likelihood method implemented with AMOS software (Arbuckle, 2009). The existence of outliers was assessed by the square distance of Mahalanobis (D^2) and the variables' normality by the asymmetry coefficient (Sk) and uni- and multivariate kurtosis (Ku). No variable had Sk and Ku values indicating severe violations of normal distribution, $|Sk| < 3$ and $|Ku| < 10$. No values of DM^2 were found to indicate the existence of outliers, nor were there sufficiently strong correlations between the exogenous variables to indicate possible multicollinearity problems. The VIF was calculated with SPSS Statistics and no variable showed VIF indicators of multicollinearity.

Table V indicates the non-standardized regression coefficients, standard errors, critical ratios and standardized regression coefficients for the factors measuring the organic dimension of HRM. The model with standardized estimates of the regression coefficients and the R^2 of the criterion variables is represented in Figures 1 and 2.

Considering the organic dimension, the adjusted model is found to explain 62 per cent of the variance of knowledge-centred culture, 47 per cent of KM competitive orientation, 69 per cent of KM formal practices and 34 per cent of KM informal practices (see Table VII). Therefore, formal KM practices and knowledge-centred culture are shown to depend most on an organic perspective of career management. Analysing the trajectories of the predictive variables to the criterion variables, the highest are seen to relate to the influence of professional training as investment on the four factors of KM, particularly knowledge-centred culture ($\beta = 0.78$) and competitive orientation ($\beta = 0.75$). Career management based on merit and development and retention oriented to factors intrinsic to the work relationship only demonstrate a significant influence on formal KM practices, and even so, classified with a low magnitude considering the criteria defined by

Table IV.
Multiple regression analysis (enter method) of KM predicted from the two factors of the retention

Retention – predictors	KM global scale				KM – criterions: *KM*_F1: knowledge-centred culture				*KM*_F2: competitive orientation				*KM*_F3: formal KM practices				*KM*_F4: informal KM practices			
	b	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	*β*	*t*	*b*	SE	*β*	*t*
*RPA_F*1	0.42	0.02	0.57	17.4***	0.40	0.03	0.51	14.4***	0.32	0.03	0.39	10.4***	0.63	0.03	0.68	22.9***	0.30	0.03	0.34	9.1***
*RPA_F*2	0.04	0.02	0.07	2.1*	0.03	0.02	0.04	1.1	0.06	0.03	0.08	2.2*	0.03	0.02	0.04	1.2	0.08	0.03	0.11	2.8**
	$r_{multiple} = 0.829, R^2 = 0.379$				$r_{multiple} = 0.531$, $R^2 = 0.282$				$r_{multiple} = 0.440$, $R^2 = 0.194$				$r_{multiple} = 0.702$, $R^2 = 0.492$				$r_{multiple} = 0.414$, $R^2 = 0.172$			
	$R^2_{adj} = 0.378$, SE = 0.396				$R^2_{adj} = 0.280$, SE = 0.451				$R^2_{adj} = 0.192$, SE = 0.500				$R^2_{adj} = 0.491$, SE = 0.449				$R^2_{adj} = 0.170$, SE = 0.531			
	$F(2, 847) = 258.5$, $p < 0.001$				$F(2, 847) = 166.2$, $p < 0.001$				$F(2, 847) = 101.8$, $p < 0.001$				$F(2, 847) = 410.8$, $p < 0.001$				$F(2, 847) = 87.7$, $p < 0.001$			

Notes: *RPA*_F1, retention oriented to factors intrinsic to the work relationship; *RPA*_F2, retention oriented to factors extrinsic to the work relationship. *$p < 0.05$; **$p < 0.01$ ***$p < 0.001$

Cohen (1988). Professional training as investment was therefore shown to be the major organic variable influencing KM processes (Figure 3).

A new multivariate multiple linear regression for the mechanical dimension of HRM was performed (see Table VI and Figure 2). This adjusted model explains a lower percentage of the variance of the four KM processes than the organic perspective model. The mechanical dimension explains only 17 per cent of the variance of knowledge-centred culture, 14 per cent of competitive orientation, 20 per cent of formal practices and 14 per cent of informal practices of KM (see Table VII). Although the trajectories of the predictive variables to the criterion variables are statistically significant, some have a positive influence and others a negative one, despite the association between the predictive variables always being positive. Therefore, career management based on length of service and tenure and retention oriented to factors extrinsic to the work relationship have a positive influence on the four dimensions of KM, while professional training as a restriction influences these

	b	SE	CR	*β*
*CMPA*_F1 → *KM*_F1	0.013	0.030	0.425	0.015
*CMPA*_F1 → *KM*_F2	−0.080	0.037	−2.156	−0.091*
*CMPA*_F1 → *KM*_F3	0.183	0.032	5.683	0.182***
*CMPA*_F1 → *KM*_F4	0.029	0.043	0.664	0.031
*PTPA*_F1 → *KM*_F1	0.764	0.030	25.058	0.783***
*PTPA*_F1 → *KM*_F2	0.764	0.037	20.470	0.750***
*PTPA*_F1 → *KM*_F3	0.614	0.032	19.014	0.532***
*PTPA*_F1 → *KM*_F4	0.606	0.044	13.894	0.567***
*RPA*_F1 → *KM*_F1	−0.011	0.027	−0.408	−0.014
*RPA*_F1 → *KM*_F2	−0.004	0.034	−0.128	−0.005
*RPA*_F1 → *KM*_F3	0.185	0.029	6.350	0.199***
*RPA*_F1 → *KM*_F4	−0.004	0.039	−0.104	−0.005

Notes: *$p < 0.05$; ***$p < 0.001$

Table V. Non-standardized regression coefficients (*b*), standard-errors (SE), critical ratios (CR) and standardized regression coefficients (*β*) of KM processes predicted from the organic dimension of human resources

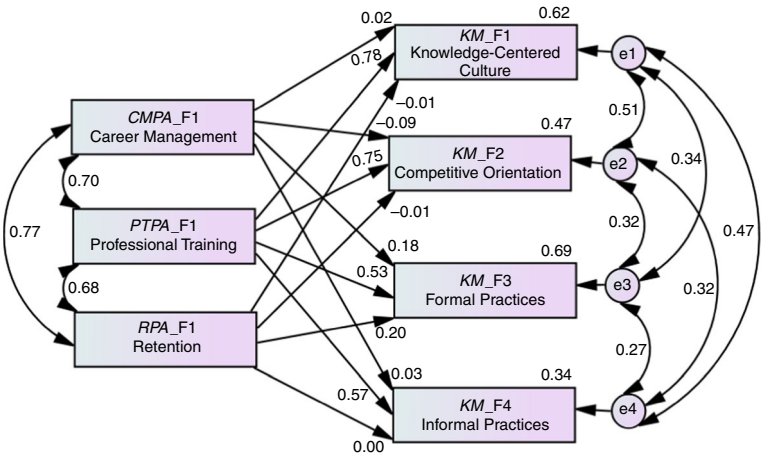

Figure 2. Multivariate multiple linear regression model of KM processes predicted from the Organic dimension of HRM

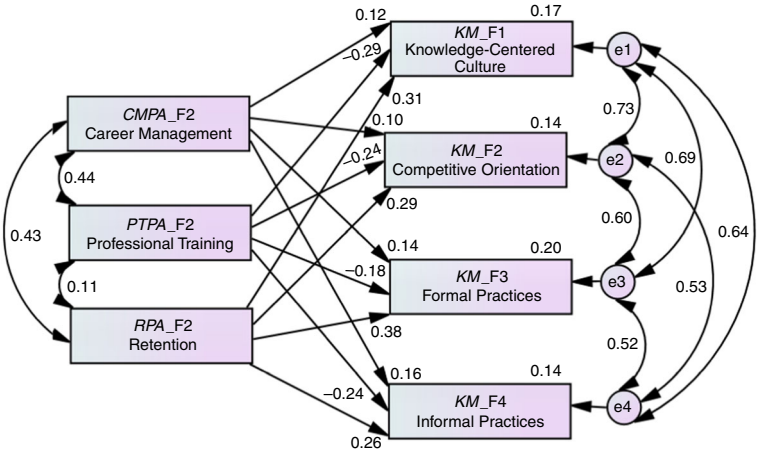

Figure 3.
Multivariate multiple linear regression model of KM processes predicted from the Mechanical dimension of HRM

Table VI.
Non-standardized regression coefficients (*b*), standard-errors (SE), critical ratios (CR) and standardized regression coefficients (β) of KM processes predicted from the mechanical dimension of human resource management

	b	SE	CR	β
*CMPA*_F2 → *KM*_F1	0.109	0.034	3.224	0.124**
*CMPA*_F2 → *KM*_F2	0.089	0.036	2.478	0.097*
*CMPA*_F2 → *KM*_F3	0.145	0.039	3.695	0.139***
*CMPA*_F2 → *KM*_F4	0.151	0.038	3.997	0.157***
*PTPA*_F2 → *KM*_F1	−0.192	0.023	−8.198	−0.287***
*PTPA*_F2 → *KM*_F2	−0.167	0.025	−6.682	−0.239***
*PTPA*_F2 → *KM*_F3	−0.141	0.027	−5.197	−0.178***
*PTPA*_F2 → *KM*_F4	−0.176	0.026	−6.719	−0.240***
*RPA*_F2 → *KM*_F1	0.200	0.023	8.863	0.307***
*RPA*_F2 → *KM*_F2	0.196	0.024	8.126	0.288***
*RPA*_F2 → *KM*_F3	0.295	0.026	11.245	0.382***
*RPA*_F2 → *KM*_F4	0.187	0.025	7.420	0.262***

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table VII.
KM processes predicted from the organic and mechanical dimensions of HRM: comparison between proportions of explained variance

	Organic	Mechanical	*z*
*KM*_F1: knowledge-centred culture	0.62	0.17	18.98***
*KM*_F2: competitive orientation to knowledge	0.47	0.14	14.78***
*KM*_F3: formal KM practices	0.69	0.20	20.33***
*KM*_F4: informal KM practices	0.34	0.14	9.65***

Note: ***$p < 0.001$

same dimensions of KM negatively. Retention oriented to factors extrinsic to the work relationship showed the mechanical dimension to have a greater influence on KM processes, especially in terms of formal KM practices and knowledge-centred culture. The least influential mechanical dimension is career management

based on length of service and tenure, with low magnitude coefficients in all the dimensions of KM.

In order to test whether the proportions of explained variance of KM factors by the organic and mechanical dimensions differ significantly, we carried out the complementary routine of SPSS for the test of the difference between two correlation coefficients (Alferes, 2002). The results (see Table VII), indicate the explained variance of the four KM factors from the organic perspective is significantly higher than the explained variance of the KM factors from the mechanical perspective.

4. Discussion

Attempting to interpret the results relating to the sub-scales in analysis (CMPA, PTPA and RPA), we find that for career management, F1 – career management based on merit and development presents a positive predictive capacity for the KM scale as a whole and for each of its constituent factors. It stands out, however, that the predictive capacity shown is greater concerning Factors 1 and 3 of KM (knowledge-centred culture and formal KM practices). F2 – career management based on length of service and tenure only allows a forecast of F1 – knowledge-centred culture, this forecast being negative. Therefore, the more an organization adopts career management practices based on length of service and tenure, the lesser the presence of a culture oriented to knowledge. Indeed, whereas F1 – career management based on merit and development is a factor promoting and facilitating knowledge-centred culture, F2 is seen to inhibit this.

Concerning the PTPA (professional training) sub-scale, we observe that only F1 – professional training as investment presents positive predictive capacities for the global KM scale and for each of its constituent factors. F2 – professional training as restriction only allows prediction of Factors 1 and 3 of KM (knowledge-centred culture and formal KM practices), this relationship being negative in the case of F1. This result replicates what happened with the factors of the CMPA scale, where we also find contrary predictive effects. Indeed, and specifically in this case, if F1 – professional training as investment facilitates and promotes knowledge-centred culture, F2 – professional training as restriction hinders the occurrence of internal knowledge-centred culture. As happens with career management, professional training also shows greater predictive capacity for Factors 1 and 3 of KM.

As for the sub-scale of PPR (retention), both factors are found to predict KM as a whole, with F1 – retention oriented to factors intrinsic to the work relationship presenting greater predictive power than F2 – retention oriented to factors extrinsic to the work relationship. We then find that F1 of retention (organic factor) shows predictive capacities of all KM factors, whereas F2 (mechanical factor) only predicts F2 (competitive orientation) and F4 (informal practices) of KM. It stands out, however, that of the four factors predicted by F1 of retention, the ones where that predictive capacity is greater are F1 and F3. Considering these results, retention (and its principles and assumptions) is seen to be unavoidable when the organization intends to follow a path giving prominence to knowledge and its management.

In this assessment analysis of the impact of HRM practices on KM processes, we find that the factor of KM showing the greatest impact is F1 – knowledge-centred culture. This result reveals the close relationship that seems to exist between organizational positioning regarding how people are looked on and managed and the dominant cultural context in relation to knowledge. Therefore, thinking how an organization's human resources are managed necessarily implies consideration of their impact on the

organization's culture in terms of orientation to knowledge. The KM factor least predicted by career management and professional training is F4 – informal KM practices. The explanation for this finding may perhaps lie in the fact of HRM being seen as a formal and institutional set of practices that are more visible and perceptible in collaborators' daily life, as opposed to informal practices and processes which occur and develop on the margins of institutional mechanisms and procedures and are therefore less visible and more difficult to perceive, identify, characterize and understand.

The results of the multivariate multiple linear regression analyses allow us to support *H1* and *H2*. Considering the influence of the organic dimension of practices of HRM on KM processes (*H1*), we conclude that professional training as investment is the major stimulant of the four KM processes, and in descending order of effect size: formal practices of KM, knowledge-centred culture, competitive orientation, and informal practices. Considering the influence of the mechanical dimension (*H2*), we conclude that the proportion of variance explained of each KM dimension is significantly smaller. Career Management based on length of service and tenure and Retention oriented to factors extrinsic to the work relationship influence the four dimensions of KM positively, while professional training as a restriction has a negative influence on these same dimensions. Retention oriented to factors extrinsic to the work relationship was shown to be the mechanical dimension influencing KM processes most, while career management based on length of service and tenure was the least influential dimension.

In agreement with our results are those presented by Monteiro and Pais (2014) in the study they made in the industrial ceramic sector, assessing the impact of training and compensation practices on the four KM processes also studied here. In a sample of 55 industrial ceramic companies, the authors concluded that KM processes seem to be consistently and negatively influenced by the underlying assumptions of the dimension that considers "training as a constraint for organizations". Indeed, this influence has always a negative sense denoting a counterproductive effect, in particular, on the "knowledge management practices" and "strategic knowledge management" dimensions, revealing the lack of neutrality of KM *vis-à-vis* HRM assumptions.

The authors also underline that the integrated application of training and compensation, with organic assumptions, seems to influence, directly and positively, KM formal practices and processes, but in particular, revealed considerable influence on (internal) cultural orientation towards the enhancement of knowledge, a facilitator, in turn, of formal and informal practices and (external) strategic orientation.

5. Conclusions, main contributions and limitations

5.1 Conclusions

Regarding the main findings, it is important to highlight that for the sub-scale CMPA – career management, F1 – career management based on merit and development presents a positive predictive ability of the KM scale as a whole and for each of its constituent factors. As for the sub-scale of RPA – retention, we find that both factors predict KM as a whole, with F1 – retention oriented to factors intrinsic to work, presenting greater predictive power than F2 – retention oriented to factors extrinsic to the work relationship. Finally, and concerning the sub-scale of PTPA – professional training, we observe that only F1 – training as investment, presents positive predictive capacities for the KM scale overall and for each of its constituent factors. F2 – training as restriction only allows prediction of Factors 1 and 3 of KM, with this relationship being negative in the specific case of F1.

These results allow us to conclude that in the organizations studied belonging to the banking sub-sector, HRM and KM processes are in operation to a considerable extent and that those related to people management are based on what tends to be organic suppositions of value and development.

There is evidence that HRM practices related to career management, training and retention, in their assumptions and perspectives of value and development, are significant and positive predictors of all the KM processes assessed here. On the other hand, the same HRM processes, when framed by restrictive and limiting assumptions and perspectives, have no effect, or a negative one, on those same KM processes.

In this context, it is possible to state that the more HRM practices are applied or in operation, in this case those of career management, professional training and retention, from a perspective of value, development and investment, the greater the likelihood of the occurrence of processes facilitating and promoting knowledge of a more explicit and formal nature and a cultural, strategic and competitive internal orientation to knowledge.

The results obtained from the univariate and multivariate multiple regression analyses performed let us conclude there is statistical support for the formulated *H1* and *H2*.

5.2 Main contributions

We can state therefore that the main contribution of this study is confirmation of the close relationship of dependency between organizational management processes regarding people and knowledge, showing the positive effect of best practices or high involvement practices of HRM on KM processes, as opposed to traditional or transactional practices.

5.3 Limitations

Finally, though the empirical results of the current research mainly support the current model, some restrictions must be taken into account: the empirical research is based on a study of a transversal nature; survey as the only source of data collection; the results are based on collaborator perception; and the data has been collected in the banking sub-sector. Therefore, additional studies of a longitudinal nature in other sectors and other organizational contexts are needed, in order to establish causal inferences with greater accuracy and precision and to confirm or invalidate the relationship explained here.

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Appendix. Scales

(1) HRMP – Human Resource Management Practices

In this firm, career management …	Almost never applies	Applies little	Applies moderately	Applies a lot	Applies almost completely
[PPGCA01] 1. Foresees that promotion decisions are mainly based on performance or merit	1	2	3	4	5
[PPGCA02] 2. Foresees that promotion decisions are mainly based on length of service	1	2	3	4	5
[PPGCA03] 3. Is centred on job security (job stability)	1	2	3	4	5
[PPGCA04] 4. Is centred on development of skills that allow holding on to the job	1	2	3	4	5
[PPGCA05] 5. Is seen as a means to give value to competences	1	2	3	4	5
[PPGCA06] 6. Defines plans for succession (in the case of absence, each collaborator knows which colleague has to substitute him/her)	1	2	3	4	5
[PPGCA07] 7. Defines personal development plans (collaborators can plan their development based, for example, on their needs or aspirations)	1	2	3	4	5
[PPGCA08] 8. Does not foresee personal development plans (there is a standard career path within each category)	1	2	3	4	5
[PPGCA09] 9. Tries to help collaborators to identify their career options (advice)	1	2	3	4	5
[PPGCA10] 10. Defines career options according to positions held	1	2	3	4	5
[PPGCA11] 11. Is carried out based on mechanisms that favour/invest in people who work here	1	2	3	4	5
[PPGCA12] 12. Foresees that each of us performs various different functions	1	2	3	4	5
[PPGCA13] 13. Allows a change of job at the same level (within the same category)	1	2	3	4	5
[PPGCA14] 14. Allows all collaborators to know exactly their career possibilities within their function	1	2	3	4	5
[PPGCA15] 15. Limits career possibilities from the outset	1	2	3	4	5

Table AI.
CMPA: career management perspectives and assumptions

	In this firm, retention …	Almost never applies	Applies litte	Applies moderately	Applies a lot	Applies almost completely
[PPR01]	1. Is achieved by promoting interesting work	1	2	3	4	5
[PPR02]	2. Is achieved with work that satisfies collaborators' needs/desires	1	2	3	4	5
[PPR03]	3. Is achieved by promoting innovation through autonomy and freedom of thought	1	2	3	4	5
[PPR04]	4. Is achieved with a firm image and reputation that attract employees with most potential	1	2	3	4	5
[PPR05]	5. Includes offering various benefits (e.g. life assurance, car, health insurance, accommodation, holidays, help for employees' children)	1	2	3	4	5
[PPR06]	6. Also includes improving the physical work environment (creating more pleasant places to work)	1	2	3	4	5
[PPR07]	7. Includes knowing employees' concerns and trying to help as much as possible	1	2	3	4	5
[PPR08]	8. Includes making studies of the organizational atmosphere (to identify factors of (dis)satisfaction and levels of effort made by collaborators	1	2	3	4	5
[PPR09]	9. Includes creating a reputation that attracts only people with the right profile for the organization's needs	1	2	3	4	5
[PPR10]	10. Includes the way we design jobs (little routine, autonomy of performance, functions that bring prestige)	1	2	3	4	5
[PPR11]	11. Includes granting other types of benefits (e.g. option to buy shares, loans to buy houses on more attractive financial terms, retirement supplement, loan schemes for workers-students to be repaid on graduation)	1	2	3	4	5
[PPR12]	12. Includes promoting activities that involve collaborators (e.g. social and cultural associations, sports clubs	1	2	3	4	5

Table AII.
RPA: retention perspectives and assumptions

In this firm …		Almost never applies	Applies little	Applies moderately	Applies a lot	Applies almost completely
[PPFP01]	1. It is above all more experienced colleagues who train less experienced ones	1	2	3	4	5
[PPFP02]	2. Professional training makes us increasingly more able to perform only our own function	1	2	3	4	5
[PPFP03]	3. Too much money is spent on professional training	1	2	3	4	5
[PPFP04]	4. We are concerned about sharing with colleagues what we learn on the training courses we attend	1	2	3	4	5
[PPFP05]	5. Everything is done to assess whether training achieved its objectives	1	2	3	4	5
[PPFP06]	6. People's continuous development is greatly valued	1	2	3	4	5
[PPFP07]	7. We all take an active role in defining training needs	1	2	3	4	5
[PPFP08]	8. Professional training improves people's performance	1	2	3	4	5
[PPFP09]	9. Professional training is only carried out because it is a legal requirement	1	2	3	4	5
[PPFP10]	10. We use what we learn in professional training	1	2	3	4	5
[PPFP11]	11. Professional training also takes place on the job	1	2	3	4	5
[PPFP12]	12. Too much time is wasted on professional training	1	2	3	4	5
[PPFP13]	13. All the money spent on professional training is considered well spent	1	2	3	4	5
[PPFP14]	14. Professional training is given priority as an immediate response to problems	1	2	3	4	5
[PPFP15]	15. Professional training is given priority to respond to the firm's needs.	1	2	3	4	5
[PPFP16]	16. Professional training is also undertaken with a thought to a possible future outside the firm	1	2	3	4	5
[PPFP17]	17. Professional training also occurs when we exchange experiences with our colleagues	1	2	3	4	5
[PPFP18]	18. Professional training is carefully planned (from surveying needs to scheduling, execution and evaluation)	1	2	3	4	5

(*continued*)

Table AIII.
PTPA: professional training perspectives and assumptions

In this firm …		Almost never applies	Applies little	Applies moderately	Applies a lot	Applies almost completely
[PPFP19]	19. No-one is responsible for matters of professional training	1	2	3	4	5
[PPFP20]	20. The professional training we receive is related to the tasks we perform	1	2	3	4	5
[PPFP21]	21. Professional training enables us to carry out diverse functions	1	2	3	4	5
[PPFP22]	22. Professional training is greatly valued	1	2	3	4	5
[PPFP23]	23. Professional training in no way contributes to improving our performance	1	2	3	4	5

Table AIII.

(2) Knowledge Management Questionnaire – short form (KMQ – SF)

1. *Almost never applies*	2. *Applies little*	3. *Applies moderately*	4. *Applies a lot*	5. *Applies almost completely*

In this firm ...	*Almost never applies*	*Applies little*	*Applies moderately*	*Applies a lot*	*Applies almost completely*
1. What we know is a fundamental "weapon" to get ahead of our competitors	1	2	3	4	5
2. We act according to how we are organized	1	2	3	4	5
3. We get together as a group to solve some problems	1	2	3	4	5
4. We attend seminars/conferences, read what is published or contract specialists	1	2	3	4	5
5. We are encouraged to use our initiative	1	2	3	4	5
6. We watch what our competitors are doing (for example, we adopt the best "tricks")	1	2	3	4	5
7. We think about how we solved problems in the past (in our successes and failures)	1	2	3	4	5
8. We pass information on to each other at our work meetings	1	2	3	4	5
9. We attend training courses or have training on the job	1	2	3	4	5
10. We try to understand the rules in our firm	1	2	3	4	5
11. We know that our competitors have information about us	1	2	3	4	5
12. Those who share what they know are rewarded	1	2	3	4	5
13. We speak about our firm	1	2	3	4	5
14. We are all responsible for what we should know to work with quality	1	2	3	4	5
15. We speak to each other about matters we do not understand well	1	2	3	4	5
16. What we know is seen in what we do better than our competitors	1	2	3	4	5
17. We chat about work when we meet casually (having a coffee, for example)	1	2	3	4	5
18. Each of us has a function to fulfil	1	2	3	4	5
19. We look for all information that can improve the quality of what we do	1	2	3	4	5
20. What we know is seen in how we produce	1	2	3	4	5
21. We tell each other funny stories that happened at work	1	2	3	4	5
22. We speak about our functions	1	2	3	4	5

Table AIV. Knowledge Management Questionnaire – short form (KMQ – SF)

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